Progress Report No. 8

Title: A Study of the Early Detection of Insect Infestations and Density/Distribution of Host Plants.

Citrus Insects Research
USDA, ARS
509 West Fourth St., Weslaco, Texas 78596

Period: September 1-30, 1973

EREP Investigation No. 319
NASA Contract No. 116301

Principal Investigator: William G. Hart
Co-Investigators: Sammy J. Ingle
M. R. Davis

NASA Technical Monitor: Ryborn R. Kirby, Mail Code TP6
NASA-Manned Spacecraft Center
Experiment Development & Integration Br.
Houston, Texas 77058

(a) Since the lower Rio Grande Valley of Texas was missed by Skylab 3 due to drift of the satellite from the original tracks, we have focused our aerial photography and interpretation in the Rio Grande Valley on insect infestations of lower density than could be detected by satellite. Light to heavy infestations caused by certain insects such as brown soft scale, citrus mealybug, and citrus blackfly, can be readily detected on color infrared film taken from aircraft at altitudes up to 10,000 feet. We have flown 15.2 hours this month, despite adverse weather conditions, recording areas where insect infestations are developing. In addition to the test areas and insect infested areas, we are mapping the entire Rio Grande Valley with color infrared film in order to determine the exact location and amount of citrus acreage, the patterns of insect infestations, and the varieties of citrus. Weekly flights have demonstrated that citrus varieties can be effectively identified at certain times of the year. Orange, grapefruit and tangerine plantings can be readily identified from 10,000 feet with color IR film in a 9-inch format camera with a 12-inch focal length. During this period we received a new multispectral camera. Test flights have been conducted with it in order to finely adjust the four lenses. Delivery of the color additive viewer is expected during the next reporting period. Since resolution with the black and white IR film

used in Skylab is superior to that of the color IR film we feel that the use of the color additive viewer with black and white IR photography should yield considerably more information than has been obtained to date.

(b) Our main effort at the present time is to map the citrus in the valley. There are 82 flight lines to photograph that are 30 miles long. Up to this time this effort has been seriously hampered by adverse weather. When we are able to complete this phase of the study the information received should be of immediate value to the Texas citrus industry and of benefit in the near future to the entire citrus industry of the United States and ultimately the world.

(c) We have acquired large amounts of data concerning ground truth and aerial photography, but additional Skylab data will be required in order to provide a relationship among the three sources of data. We acquired excellent aerial photography and ground truth information on the walnut caterpillar defoliation of pecan trees in the Seguin-Gonzales area which we set up as an alternate test site for Skylab III. We anticipate excellent information coming out of that study, particularly if we receive the S190B data and color IR or black and white IR transparencies.

(d) We have increased our capability in detecting crop problems, primarily from citrus and pecans, and we look forward to establishing the relationship of the data sources when additional data is received from Skylab in the future. The use of S190B data should greatly improve the yield of information over the 70 MM data taken during May, 1973.

(e) Flights to photograph south Texas in order to maintain records of seasonal changes and biotic factors related to them are continuing.

(f) During this period W. G. Hart was one of four P.I.'s who participated in a press conference at Houston on accomplishments since the launching of Skylab. Other travel was confined to trips to the Seguin-Gonzales area and local trips connected with the program.